

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7183

CSAH 100

OVER

ST. LOUIS RIVER

DISTRICT 1 - ST. LOUIS COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 5221 (CEI 8)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7183, Piers 1 and 2, were found to be in good condition. Since the previous inspection, the scaling around the waterline has increased in depth; however, there were still no defects of structural significance observed. The channel bottom inspected upstream and downstream of the substructure units appeared stable; however, a 3-foot-radius scour depression was observed around the upstream column of both piers. A light to moderate accumulation of timber debris was observed around both piers.

INSPECTION FINDINGS:

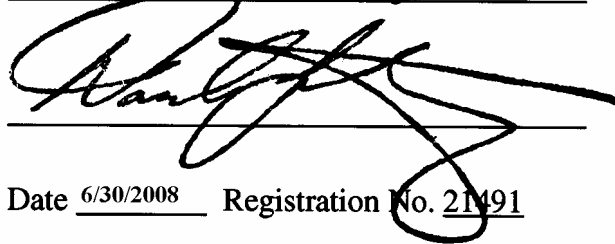
- (A) Light to moderate scaling with some aggregate exposure from 4 feet above the waterline to 1.5 feet below the waterline with typical penetrations of 1/8 inch and up to 1/4 inch maximum penetration was present at the upstream columns of Piers 1 and 2. Heavier scaling was observed at the downstream columns with a maximum penetration of 1.5 inches at both piers.
- (B) An area of section loss, 2-foot-high by 2.5-feet-wide, was observed 1 foot below the waterline with a maximum penetration of 1 inch on the downstream column of Pier 1.
- (C) A scour depression measuring 3 feet in radius with a depth of 2 feet was observed at the upstream column of Piers 1 and 2.
- (D) Light to moderate accumulations of 6 inch diameter and smaller timber debris were observed at the upstream and downstream columns of Piers 1 and 2. The debris extended from the channel bottom up 3 feet.

RECOMMENDATIONS:

- (A) Monitor the drift accumulations at both piers during future inspections, and if found to be increasing in size, removal of the timber debris during maintenance of the bridge may be warranted.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

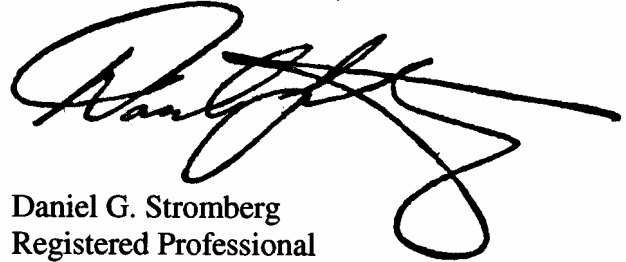
Daniel G. Stromberg

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7183

Feature Crossed: St. Louis River

Feature Carried: CSAH 100

Location: District 1 - St. Louis County

Bridge Description: The structure consists of a three span concrete beam superstructure supported by two concrete abutments and two concrete piers. The piers are numbered 1 and 2 starting from the south end of the bridge

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 24, 2007

Weather Conditions: Sunny, 55°F

Underwater Visibility: 5.0 Feet

Waterway Velocity: 1.0 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: Piers 1 and 2 consist of the reinforced concrete cap supported by two concrete columns. The concrete columns are supported by rectangular footings founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 5.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the upstream end of Pier 1.

Water Surface: The waterline was approximately 9.7 feet below reference.
Assumed Water Elevation = 90.3.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code O/02

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

 Yes X No



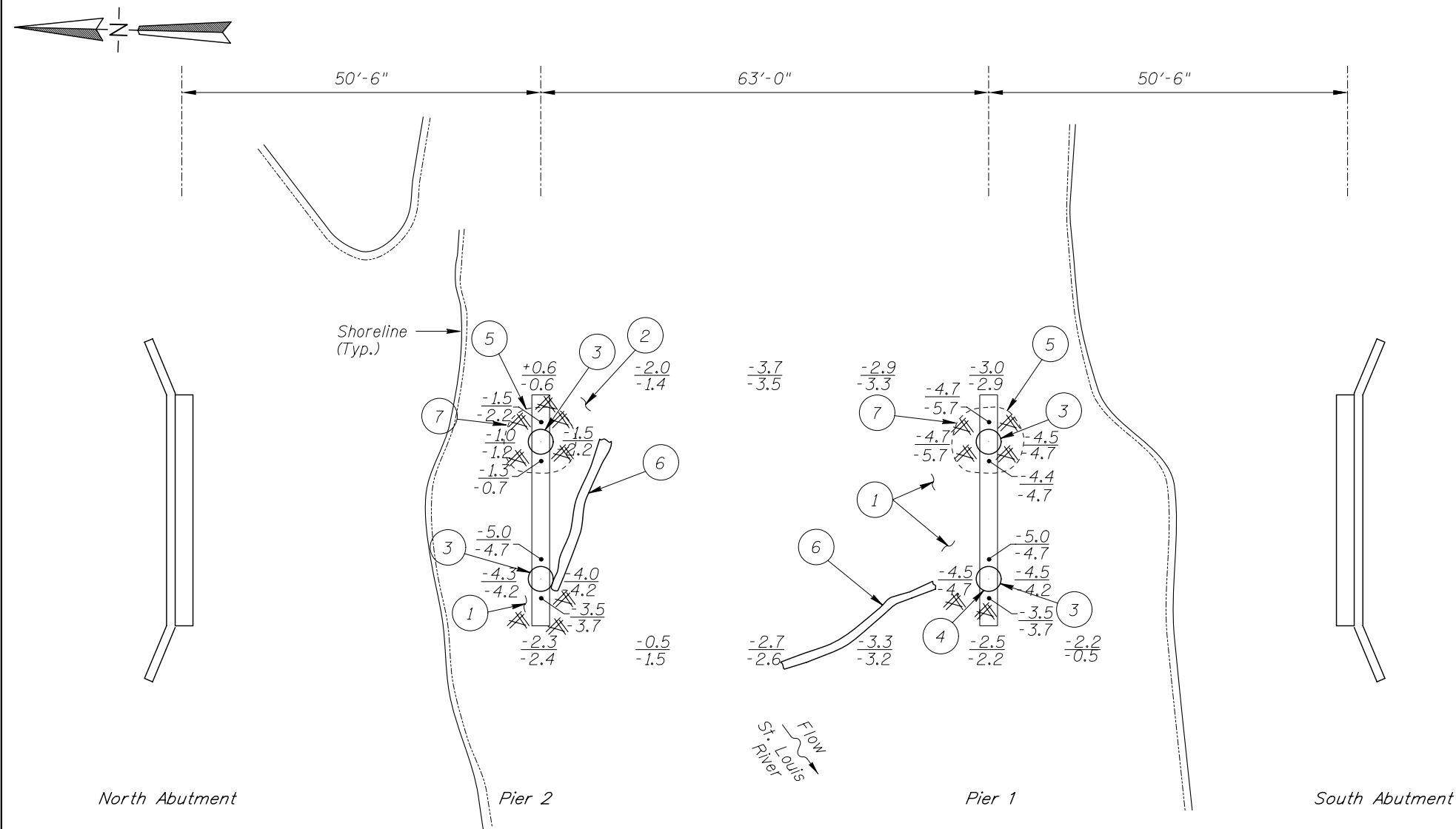
Photograph 1. Overall View of Structure, Looking Northeast.



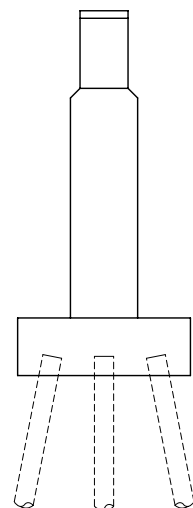
Photograph 2. View of Pier 1, Looking Northeast.



Photograph 3. View of Pier 2, Looking Northeast.



SOUNDING PLAN



TYPICAL END VIEW OF PIERS



GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 24, 2007, the waterline was located approximately 9.7 feet below the top of the cap at the upstream end of Pier 1. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 90.3.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

- 1 The channel bottom consisted of sand and gravel with 6-inch-diameter and smaller cobbles and random 1-foot-diameter riprap and a maximum probe rod penetration of 1 inch.
- 2 The channel bottom consisted of soft silt and organic material with 1.5 feet of probe rod penetration at the upstream column of Pier 2.
- 3 Light to moderate scaling with some aggregate exposure from 4 feet above the waterline to 1.5 feet below the waterline with typical penetrations of 1/8 inch and up to 1/4 inch maximum at the upstream columns. Heavier scaling was observed at the downstream columns with a maximum penetration of 1.5 inch at Pier 1 & 2.
- 4 An area of heavy scaling/section loss was observed around the downstream column of Pier 1, 2-foot-high by 2.5-feet-wide at 1 foot below the waterline with a maximum penetration of 1 inch.
- 5 A scour depression, 3 feet in radius with a depth of 2 feet, was observed at the upstream columns of Pier 1 & 2. The accumulation of timber debris was observed in the depression.
- 6 6-to 12-inch-diameter log was observed from the channel bottom to the waterline along Pier 1 & 2 as shown.
- 7 A light to moderate accumulation of 6-inch-diameter and smaller timber debris was at the upstream and downstream ends of Pier 1 & 2. Accumulations extended from the channel bottom up 3 feet.

Legend

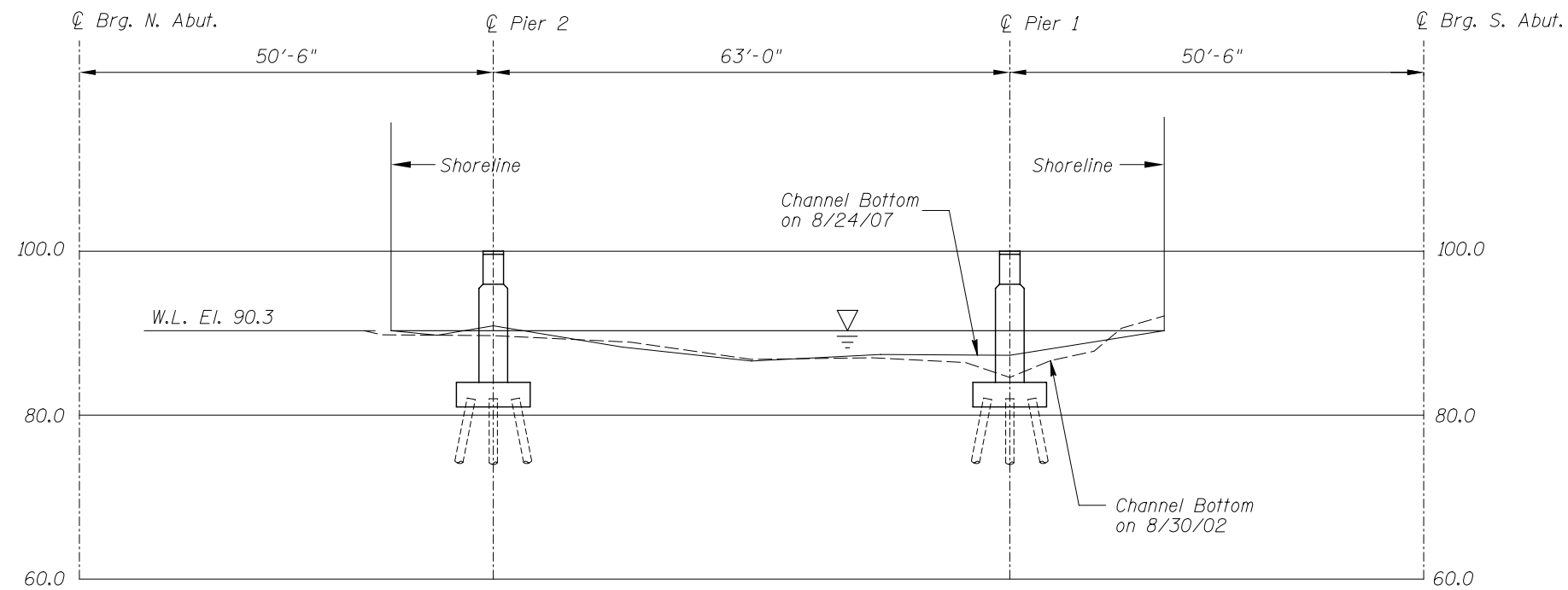
- 2.5 Sounding Depth from Waterline (8/24/07)
-3.0 Sounding Depth from Waterline (8/30/02)
-  Timber Debris
-  Scour Depression

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

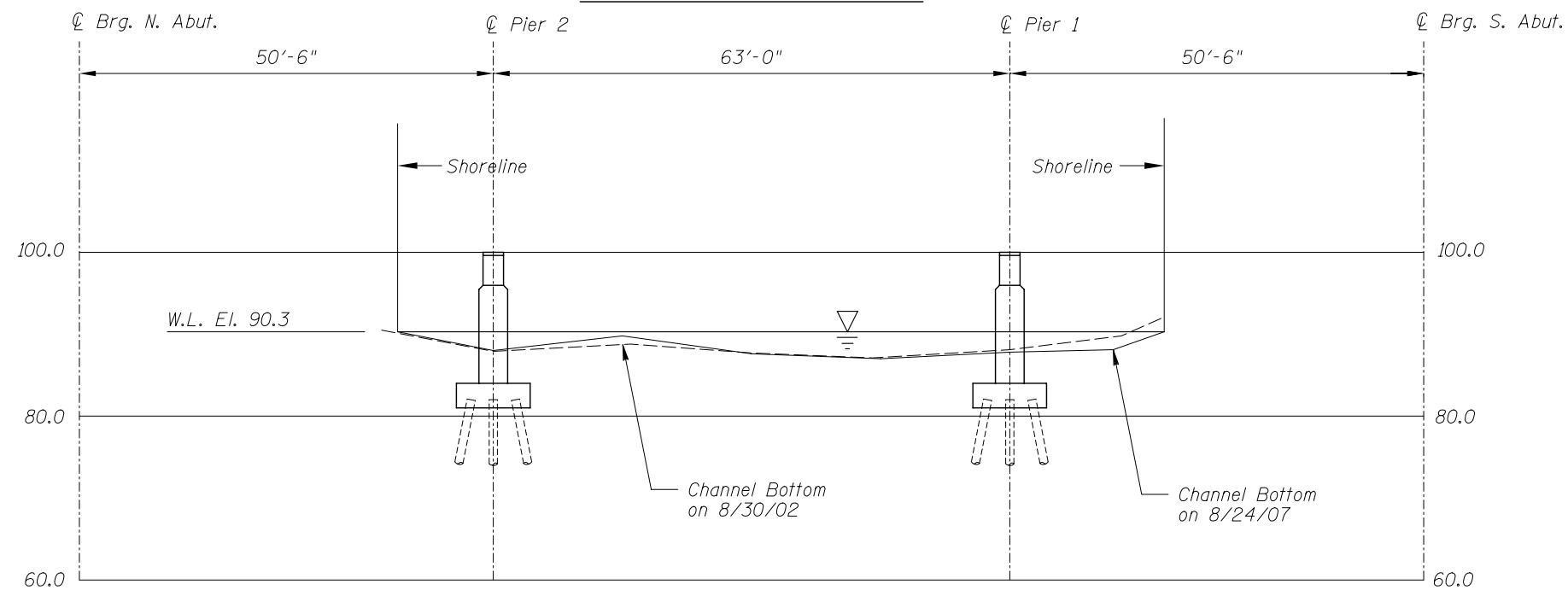
STRUCTURE NO. 7183
OVER THE ST. LOUIS RIVER
DISTRICT 1, ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: AUG. 2007
Checked By: MDK		Scale: NTS
Code: 52210008		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION			
STRUCTURE NO. 7183 OVER THE ST. LOUIS RIVER DISTRICT 1, ST. LOUIS COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES			
Drawn By: PRH	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUG. 2007	
Checked By: MDK		Scale: 1"=20'	
Code: 52210008		Figure No.: 2	

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 24, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 7183 WEATHER: Sunny, 55° F

WATERWAY CROSSED: St. Louis River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan

EQUIPMENT: SCUBA, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 5:25 p.m.

TIME OUT OF WATER: 5:50 p.m.

WATERWAY DATA: VELOCITY 1.0 fps

VISIBILITY 5.0 feet

DEPTH 5.0 feet at Piers 1 and 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the concrete of the submerged substructure units was in good condition with light to moderate scaling with some exposed aggregate from 4 feet above to 1.5 feet below the waterline. The downstream side of the downstream column at Piers 1 and 2 exhibited areas of heavier scaling with penetrations of up to 1.5 inches at both piers. A light to moderate accumulation of timber debris was observed at the upstream and downstream ends of both piers. A scour depression, with a radius of 3 feet and 2 feet of depth, was observed at the upstream columns of Piers 1 and 2.

FURTHER ACTION NEEDED: YES X NO

Monitor the drift accumulations at both piers during future inspections, and if found to be increasing in size, removal of the timber debris during normal maintenance of bridge may be warranted.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7183
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED St. Louis River

INSPECTION DATE August 24, 2007
NOTE: USE ALL APPLICABLE CONDITION
DEFINITIONS AS DEFINED IN THE MINNESOTA
RECORDING AND CODING GUIDE INCLUDING
GENERAL, SUBSTRUCTURE, CHANNEL AND
PROTECTION, AND CULVERTS AND WALL
DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	5.0'	N	7	N	9	N	7	6	7	8	6	6	7	N	N	N	N	N
	Pier 2	5.0'	N	7	N	9	N	7	6	7	8	6	6	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the submerged substructure units was in good condition with light to moderate scaling with some exposed aggregate from 4 feet above to 1.5 feet below the waterline. The downstream side of the downstream column at Piers 1 and 2 exhibited areas of heavier scaling with penetrations of up to 1.5 inches at both piers. A light to moderate accumulation of timber debris was observed at the upstream and downstream ends of both piers. A scour depression, with a radius of 3 feet and 2 feet of depth, was observed at the upstream columns of Piers 1 and 2.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.